Chapter 3.1 WATER QUALITY ASSESSMENT SUMMARY

Statewide summaries of the river miles, estuarine square miles, and lake/reservoir acres within and/or bordering Virginia are presented in Tables 3.1-1 through 3.1-4. Support of the overall uses for each waterbody was determined by examining the support of up to six designated uses, as appropriate, for each waterbody. The six designated uses are aquatic life, fish consumption, shellfishing, swimming (primary and secondary contact recreation), public water supply and wildlife.

As in previous 305(b) reports, conventional pollutant data (DO, pH, temperature, bacteria and nutrients) continued to make up the bulk of water quality assessments. Conventional pollutant data were collected and assessed from DEQ monitoring stations along with "quality assured/quality controlled" (QA/QC) approved monitoring data from other federal, state, municipal and citizen monitoring programs and compared to Virginia's Water Quality Standards. DEQ used the percentage procedure, as recommended by EPA guidance, to determine the degree of use support for conventional pollutant data. The assessment is objective except where professional judgement indicates that natural causes are responsible for the violations (or the data quality are suspect). For the 2004 assessment cycle, Virginia has used the trophic state index (TSI) to determine if natural conditions were responsible for natural dissolved oxygen (DO) impairments due to stratification. Waters not meeting the DO standards in bottom waters due to natural stratification and not excess nutrients are listed as impaired (Category 4C). These waters will not be considered for TMDL development but will need to have the DO standard adjusted for the specific waterbody, based on the natural background conditions. For DO, the instantaneous minimum standard found, in 9 VAC 25-260-50 (see Table 2.1-1), was used to assess compliance. A description of the types of data and the acceptable criteria used to determine the proper degree of use support result for each water type is described in Chapter 2.2 of this report. It should be noted that a single Category or Subcategory is assigned to each segment or assessment unit. Since each assessment unit has multiple designated uses, the worst case Category (Category 5) for any designated use will override all other Categories for that segment.

The degree of use support were classified as follows:

Not Assessed
Waters with no data for any of the designated uses or a single sample (conventional data only) was not assessed (Category 3A).

Insufficient Information
Waters, where some ancillary data are available but is insufficient to determine if designated uses are being met, are considered insufficient for water quality determination (Category 3B). Waters that have QA/QC approved data with a single exceedence in a small dataset (2-9 samples) are considered insufficient data (Category 3B). Additionally, waters where the citizen monitoring data are not QA/QC approved but the assessment results from the data review indicate no water quality problems are also considered insufficient (Category 3D).

Insufficient Information with Observed Effects
Waters, where citizen monitoring data are not QA/QC approved but the assessment results from the data indicate potential water quality problems, are considered insufficient but having observed effects (Category 3C).

Fully Supporting
QA/QC approved data that do not show excess exceedences are assessed waters as fully supporting the designated use(s). These waters would be placed in the federal Category 2 and Virginia subcategory 2A unless all designated uses are fully supporting, upon which the water would be placed in Category 1.

Fully Supporting with Observed Effects
QA/QC approved data where a WQ Standard does not exist but data exceeds state screening criteria is considered fully supporting but having observed effects. Additionally, a single exceedence of a toxic criterion within a 3-year period is also considered fully supporting but having observed effect. It is the intent of the agency to focus additional monitoring resources on the waters that are identified as having an observed effect, based on initial monitoring data analysis. These waters would be placed in the Federal Category 2 and the Virginia Subcategory 2B.

Impaired Waters Not Needing a TMDL
Waters impaired by pollution or natural conditions are impaired but do not need a TMDL. Additionally, those waters that have completed an EPA approved TMDL for specified pollutant or have other pollution control requirements that are expected to result in attainment of the WQ Standards by the next reporting period are considered impaired but not needing a TMDL. These waters are placed in the federal Category 4A, (TMDL complete for a specific pollutant), 4B (control requirements in place) or 4C (pollution and/or natural conditions).

Impaired Waters Needing a TMDL
Waters impaired by pollutant(s) exceeding WQ Standards and needing a TMDL. These waters are placed in federal Category 5 (needing a TMDL) and the Virginia subcategories of 5A, 5B, 5D and possibly 5C and 5E.

Table 3.1-1 provides an overall summary of all waters assessed for each of the designated uses. Total size of Virginia's rivers and streams was calculated to be approximately 50,537 miles. For the 2004 assessment, DEQ used the Assessment Database (ADB) version 2.1.2 that EPA has provided the states. This version is based on designating an overall assessment category for each waterbody or assessment unit. Each designated use that has associated monitoring data is evaluated and an overall assessment category is determined based on the results of the individual designated use results. As previously pointed out, Category 5 overrides all other categories in the overall assessment unit determination. Assessment unit category results can be found in Part I (Executive Summary) of the 2004 report.

Further geographical re-indexing and use of the National Hydrologic Database (NHD) has slightly increased the actual number of stream miles within the state from previous reports. The stream mile delineation guidance has provided consistent guidelines for associating the mileage assessed, relative to a specific sampling station. This is especially important where there are no easily identifiable changes in watershed characteristics. In some cases, the stream miles associated with a sampling station have been conservatively reduced from previous assessment reports. The stream mile delineation found in this report are only reflective of the 2004 assessment period but follow closely with the monitoring efforts reported in the 2002 report.

The total size of estuarine waters was approximately 2,557 square miles. Coverage of coastal shore miles remained at 120 linear shore miles. An increased effort to assess one or more designated uses in the 100 most significant public lakes was accomplished. A total of 120,751reservoir/lake acres were calculated to exist in Virginia. It should be noted that the lake/reservoir total acres have decreased from previous reports due to the delineation of only the Virginia portions of Lake Gaston and Kerr Reservoir. The North Carolina portion of these lakes had been included in the total lake/reservoir acres in previous reports. Table 3.1-2 summarizes the overall designated use assessments of Virginia's waters to determine the degree of use support for aquatic life, fish consumption, shellfish consumption (where applicable), swimming, public water supply (where applicable) and wildlife uses. Table 3.1-3 lists the causes for those waters resulting in less than full support of the Clean Water Act goals and state Water Quality Standards.

Impairment causes and/or sources can be caused by a "major impact", defined as that which causes a significant impairment to the waterbody or moderate and minor impacts. Normally, a major impact would be from a sole source with a large pollutant(s) contribution. Moderate and minor impacts have a slight to moderate effect on the waters and may be from a single moderate contributor or a combination of several minor contributors. It is important to note that moderate and minor impacts can, under certain conditions, work in conjunction to cause a major impact.

As previously stated, the causes and sources of use impairment of Virginia's waters, resulting in less than full support of Clean Water Act goals, are summarized in Tables 3.1-3 and 3.1-4. It is apparent, urban runoff and agricultural nonpoint sources are primary contributors of use impairment and major impacts. It is also important to point out that natural conditions have a major impact on water quality. Equally apparent, the primary pollutants causing use impairment are low dissolved oxygen from nutrient enrichment or natural stratification, pH problems associated with natural, low-flow, swamp waters, pathogen indicators and human health related polychlorinated biphenyls (PCBs) found in fish tissue. A new bacteria Standard for recreational use was adopted during the 2004 reporting period and the bacteria indicators have been assessed according to the new, more stringent bacteria Standard. A noticeable increase in bacteria related impairment, especially in rivers, has resulted. Additionally, the assessment of the probabilistic estuarine B-IBI (benthic) data during this reporting period has resulted in an increase in aquatic life impairment in estuarine waters.

Finally, one other assessment issue that did not affect the results of this report but will affect the results of the next report is the adoption of a new pH Standard associated with Class 7 “swamp waters”. The new pH standard became effective on February 12, 2004 but was not used in the 2004 assessment. Most of these swamp waters have been identified as naturally impaired, based on the previous pH criteria, but will likely meet the new Standard for the next reporting period.

TABLE 3.1 - 1 OVERALL INDIVIDUAL USE SUPPORT SUMMARY TABLE

Total Size: ***All Sizes Rounded to Nearest Whole Number***
Rivers – 50,537 miles
Lakes – 120,751acres
Estuaries – 2,557sq.miles

Designated Use	Water Body Type	Size Fully Supporting	Total Size Impaired	Size Naturally Impaired	Size with Insufficient Information	Size Not Assessed	Total Size Assessed
Aquatic Life	River (mi)	9,156	3,152	1,358	825	37,405	13,133
	Lakes (acres)	22,729	85,336	61,331	4,880	7,806	112,945
	Estuary (sq. mi.)	682	1,727	28	36	112	2,445
Fishing	River (mi)	4,097	684	0	110	45,646	4,891
	Lakes (acres)	34,093	45,905	0	3,250	37,503	83,248
	Estuary (sq. mi.)	1,682	98	0	7	770	1,780
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	2,156	74	0	0	43	2,230
Swimming	River (mi)	4,935	5,008	0	652	39,942	9,943
	Lakes (acres)	100,364	2,691	0	4,528	13,167	107,583
	Estuary (sq. mi.)	775	47	0	7	1,729	829
Public Water Supply	River (mi)	1,413	17	7	0	8,746	1,420
	Lakes (acres)	86,520	110	0	0	7,108	86,740
	Estuary (sq. mi.)	9	0	0	0	0	9
Wildlife	River (mi)	9,984	6	0	184	40,363	9,990
	Lakes (acres)	103,029	530	0	52	17,140	103,611
	Estuary (sq. mi.)	747	97	94	5	1,707	849

TABLE 3.1 - 2 SIZE OF WATERS IMPAIRED BY VARIOUS CAUSE CATEGORIES

Pollutant	Type	Total Size Impaired *(Rounded to Nearest Whole Number)*
Aldrin	River (mi) Lakes (acres) Estuary (mi^2)	7 0 0
Ammonia	River (mi) Lakes (acres) Estuary (mi^2)	1 0 1
Arsenic	River (mi) Lakes (acres) Estuary (mi^2)	3 0 0
Freshwater Benthic Assessment	River (mi) Lakes (acres) Estuary (mi^2)	1,179 0 0
Benzo(k)fluoranthene	River (mi) Lakes (acres) Estuary (mi^2)	19 0 0
Chlordane	River (mi) Lakes (acres) Estuary (mi^2)	1 0 0
Chloride	River (mi) Lakes (acres) Estuary (mi^2)	33 0 96
Copper	River (mi) Lakes (acres) Estuary (mi^2)	1 530 0
DDE/DDT	River (mi) Lakes (acres) Estuary (mi^2)	19 0 0
Enterococcus Pathogen Indicators	River (mi) Lakes (acres) Estuary (mi^2)	0 0 2
Escherichia coli Pathogen Indicators	River (mi) Lakes (acres) Estuary (mi^2)	588 1,810 2
Fecal Coliform Pathogen Indicators	River (mi) Lakes (acres) Estuary (mi^2)	4,826 1,066 112
Estuarine Benthic Assessment	River (mi) Lakes (acres) Estuary (mi^2)	0 0 596
Iron	River (mi) Lakes (acres) Estuary (mi^2)	7 0 0
Lead	River (mi) Lakes (acres) Estuary (mi^2)	7 0 0
Manganese	River (mi) Lakes (acres) Estuary (mi^2)	7 0 0
Mercury	River (mi) Lakes (acres) Estuary (mi^2)	264 0 2
Nutrient/Eutrophication Indicators	River (mi) Lakes (acres) Estuary (mi^2)	0 110 274
Dissolved Oxygen	River (mi) Lakes (acres) Estuary (mi^2)	1,181 85,098 1,262
pH	River (mi) Lakes (acres) Estuary (mi^2)	1,359 11,267 7

Pollutant	Type	Total Size Impaired *(Rounded to Nearest Whole Number)*
PCB's	River (mi) Lakes (acres) Estuary (mi^2)	421 45,905 96
Sulfates	River (mi) Lakes (acres) Estuary (mi^2)	10 0 0
Temperature	River (mi) Lakes (acres) Estuary (mi^2)	276 0 -
Tributyltin (TBT)	River (mi) Lakes (acres) Estuary (mi^2)	0 0 15

TABLE 3.1–3 SIZE OF WATERS IMPAIRED BY VARIOUS SOURCE CATEGORIES

Source of Impairment	Type	Total Impaired *(Rounded to Nearest Whole Number)*
Acid Mine Drainage	River (mi) Lakes (acres) Estuary (mi^2)	36 0 0
Agriculture	River (mi) Lakes (acres) Estuary (mi^2)	611 863 0
Animal Feeding Operations	River (mi) Lakes (acres) Estuary (mi^2)	194 0 0
Atmospheric Deposition-Acidity	River (mi) Lakes (acres) Estuary (mi^2)	166 0 0
Atmospheric Deposition-Nitrogen	River (mi) Lakes (acres) Estuary (mi^2)	0 0 1,089
Changes in Ordinary Stratification and Bottom Water Hypoxia/Anoxia	River (mi) Lakes (acres) Estuary (mi^2)	0 11,459 146
Channelization	River (mi) Lakes (acres) Estuary (mi^2)	3 0 0
Combined Sewer Overflows	River (mi) Lakes (acres) Estuary (mi^2)	36 0 3
Commercial Districts (Industrial Parks)	River (mi) Lakes (acres) Estuary (mi^2)	3 0 0
Contaminated Sediments	River (mi) Lakes (acres) Estuary (mi^2)	133 0 0
Dam or Impoundment	River (mi) Lakes (acres) Estuary (mi^2)	44 1,380 0
Discharges from Municipal Storm Sewers	River (mi) Lakes (acres) Estuary (mi^2)	161 13 0
Drought-related Impacts	River (mi) Lakes (acres) Estuary (mi^2)	1 0 0
Grazing in Riparian or Shoreline Zones	River (mi) Lakes (acres) Estuary (mi^2)	216 0 0
Illegal Dumps or other Inappropriate Waste Disposal	River (mi) Lakes (acres) Estuary (mi^2)	1 0 0
Illicit Hookups/Connections to Storm Sewers	River (mi) Lakes (acres) Estuary (mi^2)	14 0 0
Impacts from Abandoned Mine Lands	River (mi) Lakes (acres) Estuary (mi^2)	28 0 0
Industrial Point Source Discharge	River (mi) Lakes (acres) Estuary (mi^2)	148 1,090 0
Landfills	River (mi) Lakes (acres) Estuary (mi^2)	2 0 0

Source of Impairment	Type	Total Impaired *(Rounded to Nearest Whole Number)*
Leaking Underground Storage Tanks	River (mi) Lakes (acres) Estuary (mi^2)	2 0 0
Livestock Grazing or Feeding Operations	River (mi) Lakes (acres) Estuary (mi^2)	133 0 0
Loss of Riparian Habitat	River (mi) Lakes (acres) Estuary (mi^2)	87 0 0
Managed Pasture Grazing	River (mi) Lakes (acres) Estuary (mi^2)	14 0 0
Mine Tailings	River (mi) Lakes (acres) Estuary (mi^2)	7 0 0
Urbanized High density Area	River (mi) Lakes (acres) Estuary (mi^2)	782 1,816 7
Municipal Point Source Discharges	River (mi) Lakes (acres) Estuary (mi^2)	134 0 1,092
Natural Conditions – Water Quality Use Attainability	River (mi) Lakes (acres) Estuary (mi^2)	2,232 75,374 211
Natural Sources	River (mi) Lakes (acres) Estuary (mi^2)	0 0 9
Non-Point Sources	River (mi) Lakes (acres) Estuary (mi^2)	1,959 252 1,110
On-site Treatment Systems	River (mi) Lakes (acres) Estuary (mi^2)	178 0 7
Other Shipping releases (Wastes and Detritus)	River (mi) Lakes (acres) Estuary (mi^2)	0 0 15
Package Plant or other Permitted Small Flow Discharges	River (mi) Lakes (acres) Estuary (mi^2)	5 0 0
Releases from Waste Sites or Dumps	River (mi) Lakes (acres) Estuary (mi^2)	4 0 0
Residential Districts	River (mi) Lakes (acres) Estuary (mi^2)	26 0 0
Sanitary Sewer Overflows	River (mi) Lakes (acres) Estuary (mi^2)	88 756 0
Septage Disposal	River (mi) Lakes (acres) Estuary (mi^2)	34 0 0
Ship Building, Repairs, Drydocking	River (mi) Lakes (acres) Estuary (mi^2)	0 0 15
Source Unknown	River (mi) Lakes (acres) Estuary (mi^2)	3,857 59,825 687
Sources Outside State Jurisdiction or Borders	River (mi) Lakes (acres) Estuary (mi^2)	0 0 1,089

Source of Impairment	Type	Total Impaired *(Rounded to Nearest Whole Number)*
Streambank Modification or Destabilization	River (mi) Lakes (acres) Estuary (mi^2)	41 0 0
Surface Mining	River (mi) Lakes (acres) Estuary (mi^2)	91 0 0
Unpermitted Discharge (Domestic Wastes)	River (mi) Lakes (acres) Estuary (mi^2)	5 0 0
Upstream Impoundments (PI 566 NRCS Structures)	River (mi) Lakes (acres) Estuary (mi^2)	2 0 0
Upstream Source	River (mi) Lakes (acres) Estuary (mi^2)	21 349 0
Wastes from Pets	River (mi) Lakes (acres) Estuary (mi^2)	19 0 0
Waterfowl	River (mi) Lakes (acres) Estuary (mi^2)	38 0 0
Wet Weather Discharges	River (mi) Lakes (acres) Estuary (mi^2)	28 0 0
Wildlife other than Waterfowl	River (mi) Lakes (acres) Estuary (mi^2)	1,913 863 0